

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original): An OFDM receiver apparatus to receive an OFDM signal, comprising:

- a receiver to receive an OFDM signal having a plurality of sub-carriers every symbol;
- a distortion estimator which estimates a distortion using each sub-carrier of the sub-carriers of the OFDM signal to generate channel distortion information;
- a distortion compensator which subjects the sub-carrier to distortion compensation according to a control signal to generate a distortion-compensated sub-carrier;
- a demodulator to demodulate the distortion-compensated sub-carrier;
- a phase distortion estimator to generate first phase distortion information indicating a phase distortion of each sub-carrier every symbol, using the distortion-compensated sub-carrier and the distortion information;
- a weighting synthesizer to weight the first phase distortion information by a plurality of weighting factors with time function over a plurality of symbol intervals and then synthesize the first phase distortion information, to generate a plurality of second phase distortion information; and
- a control signal generator to generate the control signal using the distortion information and the plurality of second phase distortion information.

Claim 2 (Original): An OFDM receiver apparatus according to claim 1, which further includes

- a converter to convert the received OFDM signal to a digital baseband signal;
- a synchronizer to synchronize the digital baseband signal with respect to a time and a frequency to generate a synchronized digital baseband signal; and

a separation unit configured to separate the sub-carriers of the OFDM signal by subjecting the synchronized digital baseband signal to a Fourier transform.

Claim 3 (Currently Amended): An OFDM receiver apparatus according to claim 1, wherein the symbol includes a data sub-carrier and a known sub-carrier as the sub-carrier signal, the phase distortion ~~estimation unit~~ estimator has a phase distortion information threshold, and weights and synthesizes a phase error component of the known sub-carrier of the distortion-compensated sub-carrier signal, and ~~generate~~ generates the first phase distortion information by clipping a weighted and synthesized component using the phase distortion information threshold.

Claim 4 (Currently Amended): The OFDM receiver apparatus according to claim 1, wherein the symbol includes a data sub-carrier and a known sub-carrier as the sub-carrier signal, and the weighting synthesizer ~~and the weighting moving average unit each use~~ uses as the plurality of weighting ~~factor~~ factors a first weighting coefficient and a second weighting coefficient which differ in coefficient value between an interval corresponding to the data sub-carrier and an interval corresponding to the known sub-carrier.

Claim 5 (Currently Amended): The OFDM receiver apparatus according to claim 1, wherein the symbol includes signal of data sub-carrier and a known sub-carrier as the sub-carrier signal, and ~~one of the weighting synthesizer and the weighting moving average unit~~ uses a first weighting factor whose value is substantially constant in time in an interval corresponding to the data sub-carrier, and a second weighting factor whose past coefficient value is small relatively in an interval corresponding to the known sub-carrier.

Claim 6 (Currently Amended): The OFDM receiver apparatus according to claim 1, wherein the symbol includes a data sub-carrier and a known sub-carrier as the sub-carrier signal, ~~one of the weighting synthesizer and the weighting moving average unit~~ generates the second phase distortion information using as the plurality of weighting factor factors a first weighting coefficient and a second weighting coefficient which differ in coefficient value between an interval corresponding to the data sub-carrier and an interval corresponding to the known sub-carrier, and the control signal generator generates the control signal by ~~means of~~ the second phase distortion information generated by the weighting synthesizer using the first weighting factor in the interval corresponding to the data sub-carrier, and generates the control signal by ~~means of~~ the second phase distortion information generated by the weighting synthesizer using the second weighting factor in the interval corresponding to the known sub-carrier.

Claim 7 (Original): The OFDM receiver apparatus according to claim 1, which further comprises a residual distortion removing unit configured to remove a residual distortion from the distortion-compensated sub-carrier.

Claim 8 (Currently Amended): An OFDM receiver apparatus to receive an OFDM signal, comprising:

- a receiver to receive an OFDM signal having a plurality of sub-carriers;
- a distortion estimator which estimates a distortion by using each sub-carrier of the received OFDM signal, to generate distortion information indicating the distortion;
- a distortion compensator which subjects the sub-carrier to distortion-compensation according to a control signal to generate a distortion-compensated sub-carrier;
- a demodulator to demodulate the distortion-compensated sub-carrier;

a phase distortion estimator which generates first phase distortion information indicating a phase distortion of the distortion-compensated sub-carrier every symbol, using the distortion-compensated sub-carrier and the distortion information;

a weighting moving average unit configured to subject the phase distortion information to weighted moving average by using a weighting factor with time function over a plurality of symbol intervals, to generate second phase distortion information; and

a control signal generator to generate the control signal by means of the distortion information and the second phase distortion information.

Claim 9 (Original): An OFDM receiver apparatus according to claim 8, which further includes

a converter to convert the received OFDM signal to a digital baseband signal;

a synchronizer to synchronize the digital baseband signal with respect to a time and a frequency to generate a synchronized digital baseband signal; and

a separation unit configured to separate the sub-carriers of the OFDM signal by subjecting the synchronized digital baseband signal to a Fourier transform.

Claim 10 (Currently Amended): An OFDM receiver apparatus according to claim 8, wherein the symbol includes a data sub-carrier and a known sub-carrier as the sub-carrier signal, the phase distortion ~~estimation unit~~ estimator has a phase distortion information threshold, and weights and synthesizes a phase error component of the known sub-carrier of the distortion-compensated sub-carrier signal, and ~~generate~~ generates the first phase distortion information by clipping a weighted and synthesized component using the phase distortion information threshold.

Claim 11 (Currently Amended): A OFDM receiver apparatus according to claim 8, wherein ~~one of the weighting synthesizer and~~ the weighting moving average unit includes a selector to select the weighting factor from a plurality of weighting factor candidates of a plurality of time functions.

Claim 12 (Currently Amended): The OFDM receiver apparatus according to claim 8, wherein the symbol includes a data sub-carrier and a known sub-carrier as the sub-carrier signal, and ~~the weighting synthesizer and~~ the weighting moving average unit ~~each use~~ uses as the weighting factor a first weighting coefficient and a second weighting coefficient which differ in coefficient value between an interval corresponding to the data sub-carrier and an interval corresponding to the known sub-carrier.

Claim 13 (Currently Amended): The OFDM receiver apparatus according to claim 8, wherein the symbol includes signal of data sub-carrier and a known sub-carrier as the sub-carrier signal, and ~~one of the weighting synthesizer and~~ the weighting moving average unit uses a first weighting factor whose value is substantially constant in time in an interval corresponding to the data sub-carrier, and a second weighting factor whose past coefficient value is small relatively in an interval corresponding to the known sub-carrier.

Claim 14 (Currently Amended): The OFDM receiver apparatus according to claim 8, wherein the symbol includes a data sub-carrier and a known sub-carrier as the sub-carrier signal, ~~one of the weighting synthesizer and~~ the weighting moving average unit generates the second phase distortion information using as the weighting factor a first weighting coefficient and a second weighting coefficient which differ in coefficient value between an interval corresponding to the data sub-carrier and an interval corresponding to the known sub-carrier,

and the control signal generator generates the control signal by ~~means of~~ the second phase distortion information generated by the weighting synthesizer moving average unit using the first weighting factor in the interval corresponding to the data sub-carrier, and generates the control signal by ~~means of~~ the second phase distortion information generated by the weighting synthesizer moving average unit using the second weighting factor in the interval corresponding to the known sub-carrier.

Claim 15 (Original): The OFDM receiver apparatus according to claim 8, which further comprises a residual distortion removing unit configured to remove a residual distortion from the distortion-compensated sub-carrier.

Claim 16 (Original): An OFDM receiver apparatus to receive an OFDM signal, comprising:

- a receiver to receive an OFDM signal including a plurality of sub-carriers every symbol;

- a channel distortion estimator which estimates a distortion using each sub-carrier of the sub-carriers of the OFDM signal to generate distortion information indicating the distortion;

- a distortion compensator which subjects the sub-carrier to distortion compensation according to a control signal to generate a distortion-compensated sub-carrier;

- a demodulator to demodulate the distortion-compensated sub-carrier;

- a phase distortion estimator to generate first phase distortion information indicating a phase distortion of each sub-carrier every symbol, using the distortion-compensated sub-carrier and the distortion information;

a weighting synthesizer to weight the first phase distortion information by a plurality of weighting factors with time function over a plurality of symbol intervals and then synthesize the first phase distortion information, to generate a plurality of second phase distortion information corresponding to the weighting factors; and

a control signal generator to generate the control signal using the channel distortion information and the plurality of second phase distortion information substantially to weight the sub-carriers by the weighting factors, individually.

Claim 17 (Original): An OFDM receiver comprising:

a receiver circuit configured to receive an OFDM signal including a plurality of sub-carriers every symbol;

a distortion evaluation circuit configured to evaluate a distortion using each of the sub-carriers of the OFDM signal, and generate channel distortion information;

a distortion compensation circuit to subject the sub-carriers to distortion compensation according to a control signal and to generate a plurality of distortion-compensated sub-carriers;

a demodulation circuit configured to demodulate the distortion-compensated sub-carriers;

a phase distortion estimation circuit configured to generate first phase distortion information indicating a phase distortion of each sub-carrier every symbol, using the distortion-compensated sub-carrier and the channel distortion information;

a weighting synthesis circuit configured to generate a plurality of second phase distortion information corresponding to a plurality of weighting factors by weighting the first phase distortion information using the weighting factors of a time function over a plurality of symbol intervals; and

a control signal generation circuit configured to generate the control signal using the channel distortion information and the second phase distortion information in order to weight the sub-carriers by the weighting factors individually.

Claim 18 (Original): The OFDM receiver according to claim 17, wherein the distortion compensation circuit comprises a distortion compensation circuit to subject each sub-carrier signal to distortion-compensation plural times.

Claim 19 (Currently Amended): The OFDM receiver according to claim 18, wherein the distortion compensation circuit comprises a first equalizer to subject each sub-carrier signal from the receiver circuit to distortion compensation according to ~~[[the]]~~ a first control signal and a second equalizer to subject an output signal of the first equalizer to distortion compensation according to ~~[[the]]~~ a second control signal.